CCEWOOL Thermomax Inc.

Petrochemical Industry - Design and construction of the atmospheric furnace

Overview:

The atmospheric furnace is a heating furnace that obtains different distillate products, such as gasoline, diesel, and kerosene, by distilling raw oil under normal pressure or separating different components of alkanes. The structure of the atmospheric heating furnace is basically similar to that of the general heating furnace, which is divided into two types: a cylindrical furnace and a box furnace. Each furnace is composed of a radiation chamber and a convection chamber. Heat is mainly supplied by radiation in the radiation chamber, and heat in the convection chamber is mainly transferred by convection. The process temperature of the distillation separation reaction is generally 180-350°C, and the furnace temperature of the radiation chamber is generally 700-800°C. In view of the above characteristics of the atmospheric furnace, the fiber lining is generally only used for the walls and the top of the radiation chamber. The convection chamber is generally cast with refractory castable.

Determining lining materials:

Considering the furnace temperature (usually about 700-800℃) and a weak reducing atmosphere in the atmospheric furnace as well as our years of design and construction experience and the fact that a large number of burners is generally distributed in the furnace at the top and the bottom and the sides of the wall, the lining material of atmospheric furnace is determined to include a 1.8-2.5m high CCEFIRE light-brick lining. The remaining parts use CCEWOOL high-aluminum ceramic fiber components as the hot surface material for the

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lining, and the back lining materials for ceramic fiber components and light bricks use CCEWOOL standard ceramic fiber blankets.

Lining structure:

According to the distribution of the burner nozzles in the atmospheric furnace, there are two types of furnace structures: a cylindrical furnace and a box furnace, so there are two types of structure.

A cylindrical furnace:

Based on the structural characteristics of the cylindrical furnace, the light brick part at the bottom of the furnace walls of the radiant chamber should be tiled with CCEWOOL ceramic fiber blankets, and then stacked with CCEFIRE light refractory bricks; the remaining parts can be tiled with two layers of CCEWOOL standard ceramic fiber blankets, and then stacked with high-aluminum ceramic fiber components in a herringbone anchoring structure.

The top of the furnace adopts two layers of CCEWOOL standard ceramic fiber blankets, and then stacked with high-aluminum ceramic fiber modules in a single-hole hanging anchor structure as well as folding modules welded to the furnace wall and fixed with screws.

A box furnace

Based on the structural characteristics of the box furnace, the light brick part at the bottom of the furnace walls of the radiant chamber should be tiled with CCEWOOL ceramic fiber blankets, and then stacked with CCEFIRE lightweight refractory bricks; the rest can be tiled with two layers of CCEWOOL standard ceramic fiber blankets, and then stacked with high-aluminum fiber components in an angle iron anchor structure.

The top of the furnace adopts two tiled layers of CCEWOOL standard ceramic fiber blankets stacked with high-aluminum ceramic fiber modules in a single-hole hanging anchor structure.

These two structural forms of the fiber components are relatively firm in installation and fixing, and the construction is quicker and more convenient. Moreover, they are easy to disassemble and assemble during maintenance. The fiber lining has good integrity, and the heat insulation performance is remarkable.

The form of fiber lining installation arrangement:

According to the characteristics of the anchoring structure of the fiber components, the furnace walls adopt "herringbone" or "angle iron" fiber components, which are arranged in the same direction along the folding direction. The fiber blankets of the same material between different rows are folded into a U shape to compensate for fiber shrinkage.

For the central hole hoisting fiber components installed along the central line to the edge of the cylindrical furnace at the top of the furnace, the "parquet floor" arrangement is adopted; the folding blocks at the edges are fixed by screws welded on the furnace walls. The folding modules expand in the direction towards the furnace walls.

The central hole hoisting fiber components at the top of the box furnace adopt a "parquet floor" arrangement.